

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 09 AUG 2005

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|---|--|--|
| Applicant's or agent's file reference<br>VS:CE:FP19619  | <div style="display: flex; justify-content: space-between;"> <div>FOR FURTHER ACTION</div> <div>See Form PCT/IPEA/416</div> </div> |  |
| International application No.<br>PCT/AU2004/000474  | International filing date (day/month/year)<br>8 April 2004   | Priority date (day/month/year)<br>8 April 2003 |
| International Patent Classification (IPC) or national classification and IPC<br>Int. Cl. <sup>7</sup> C07K 7/06, 7/08, 14/595; A61K 33/24; A61P 1/00, 35/00 |  |  |
| Applicant<br>THE UNIVERSITY OF MELBOURNE et al  |  |  |

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:
    - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
 

|                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input checked="" type="checkbox"/> | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application   |

|   |  |
|---|--|
| Date of submission of the demand<br>2 September 2004  | Date of completion of the report<br>22 July 2005                               |
| Name and mailing address of the IPEA/AU<br>AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>E-mail address: pct@ipaaustralia.gov.au<br>Facsimile No. (02) 6285 3929 | Authorized Officer<br><br><b>G. D. HEARDER</b><br>Telephone No. (02) 6283 2553 |

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000474

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1 (b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
  - ☐ the international application as originally filed/furnished
  - ☒ the description:
    - pages 1-97 as originally filed/furnished
    - pages\* received by this Authority on with the letter of
    - pages\* received by this Authority on with the letter of
  - ☒ the claims:
    - pages 98-100 as originally filed/furnished
    - pages\* as amended (together with any statement) under Article 19
    - pages\* 101-103 received by this Authority on 2 September 2004 with the letter of 2 September 2004
    - pages\* received by this Authority on with the letter of
  - ☒ the drawings:
    - pages 1/26-26/26 as originally filed/furnished
    - pages\* received by this Authority on with the letter of
    - pages\* received by this Authority on with the letter of
  - ☒ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
  - ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule, 70.2(c)).
  - ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000474

## Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos: 24 (in part) and 27-40 (in part)

because:

☐ the said international application, or the said claims Nos.

relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claim Nos. 24 (in part) and 27-40 (in part)

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000474

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

|                               |   |     |
|-------------------------------|---|-----|
| Novelty (N)                   | Claims 1-23, 30-31 (in part), 33-40 (in part)               | YES |
|                               | Claims 24-29, 32  | NO  |
| Inventive step (IS)           | Claims 6, 7, 10-12, 14-17, 30-31 (in part), 33-34 (in part) | YES |
|                               | Claims 1-5, 8, 9, 13, 18-29, 32, 35-40                      | NO  |
| Industrial applicability (IA) | Claims 1-40   | YES |
|                               | Claims  | NO  |

## 2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1: Chemical Abstracts, Accession No. 82:125591

D2: Journal of Biological Chemistry, 2002, vol. 277, No. 50, pages 48602-48609

D3: US 4117117

D4: International Journal of Peptide and Protein Research (1990), Vol. 35, No. 6, pages 527-538

D5: Hoppe-Seyler's Z. Physiol. Chem. (1979), Vol. 360 No. 1, pages 73-80

D6: Biochemical and Biophysical Research Communications (1974) Vol. 60, No. 2, pages 820-824

Novelty

D1 discloses a peptide LEEEEEEAYG which has been excluded from claim 24 by way of a proviso. Therefore claims 1-40 are novel when compared to D1.

D2 discloses a number of peptides related to glycine-extended gastrin 17 peptide in Figure 1, including Ggly5-18. D2 also discloses the ability of these peptides to bind ferric ions. Despite the applicant's submission to the contrary, D2 is quite unambiguous in stating that ferric ions are essential for the activity of gastrin. Therefore claims 24-29 and 32 are not novel when compared to D2. Claims 1-23 define methods of treatment using certain metal complexes of non-amidated gastrin. These are not disclosed in D2 and are therefore novel. The particular metal complexes and uses thereof in claims 30, 31 and 33-40, as well as the uses of the peptides themselves, are not disclosed in D2 and therefore are novel.

D3 discloses the synthesis of a peptide with gastrin action of the sequence LEEEEEEAYGWLDFG. This differs from the sequence of Ggly5-18 only in the leucine for a methionine in the 13<sup>th</sup> position. However the sequence comprises at least glutamate residue 7 of non-amidated gastrin. D3 is silent on the capability of the peptide to bind ferric ions. Therefore the claims are novel when compared to D3.

D4 discloses a protected human gastrin protein p-EGPWLEEEEEAYGWMDF; D5 discloses a minigastrin peptide WLEEEEEAYGWMDF; D6 discloses a gastrin peptide EEEEEAYG. However all of D4-D6 are silent on the ability of these peptides to bind ferric ions. Therefore the claims are novel when compared to D4-D6.

**Box No. VIII** Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- (a) Claims 1-13 and 18-23 are not fully supported by the description. The claims attempt to define the method according to its desired outcome, rather than by the technical features that would achieve that outcome (i.e the chemical structure of the compounds that inhibit the binding of ferric ions to non-amidated gastrins). The desired activity should be a consequence of the technical features of the invention.
- (b) Claims 24 and 27-40 are not fully supported by the description. Claims 24 defines a peptide by its desired properties rather than by its sequence. Defining the presence of at least glutamate residue 7 of the (Glu)5-sequence does not provide enough information as to the actual sequence of the peptide. Claims 27-40, which are appended to claim 24, also lack support as a consequence.

## Supplemental Box Relating to Sequence Listing

## Continuation of Box No. I, item 2:

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this report was established on the basis of:
- a. type of material
    - ☒ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material
    - ☒ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing
    - ☒ contained in the international application as filed
    - ☐ filed together with the international application in computer readable form
    - ☐ furnished subsequently to this Authority for the purposes of search and/or examination
    - ☐ received by this Authority as an amendment\* on
2. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

\* If item 4 in Box No. I applies, the listing and/or table(s) related thereto, which form part of the basis of the report, may be marked "superseded."

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

**Continuation of: Box V.2. Citations and explanations**

**Inventive Step**

As a result of the proviso, claim 1-40 can be regarded as inventive when compared to D1.

D2 discloses a number of peptides related to glycine-extended gastrin 17 peptide, derived from IMGE-5 cells, that fall within the scope of claims 24-29 and 32 or differ from the claimed peptides only in the addition/deletion of certain amino acid residues. D2 also establishes that ferric ion binding to those gastrin peptides are essential to for biological activity (see page 48609, last paragraph). This renders claims 24-29 and 32 not inventive. The disclosure of D2 would also lead a person skilled in the art to regard inhibition of ferric ion binding as a way to modulate activity of non-amidated gastrin peptides, and the person skilled in the art would be motivated, from the disclosure of D2, to investigate this. Therefore claims 1-5, 8, 9, 13, 18-23, which merely define the invention by the result to be achieved, are also not inventive. Claims 35-40, which define screening methods and the use of undefined compounds for inhibiting the binding of ferric ions, are also not inventive. It would not be immediately obvious, however, to use the trivalent metal ions or chelating agents defined in claims 6, 7, 10-12, 14-17, 30 and 31. Therefore claims 6, 7, 10-12, 14-17, 30 (in part) and 31(in part) are inventive when compared to D2. The method defined in claims 33 (in part) and 34 (in part) are also regarded as non-obvious and inventive when compared to D2.

None of the peptides in D3-D5 actually disclose the discrete peptides as defined in claim 26, but differ from the claimed sequences by the substitution, addition/deletion of certain amino acids. It would not be immediately obvious that the peptides disclosed in these documents would be capable of binding ferric ions, therefore claims 1-40 can be regarded as inventive when compared to D3-D5. As a result claims 1-40 are inventive when compared to each of D3-D5.

D6 also discloses a peptide as defined in claim 26, but differing from the claimed sequences by the addition/deletion of certain amino acids. It is also established in D6 that the peptide has pharmaceutical applications in promoting intestinal function. Therefore claims 24-28, 32, 39 and 40 are not inventive when compared to D6.

**Industrial Applicability**

Claims 1-39 meet the requirements for industrial applicability.